CONSUMERS' FAMILIARITY WITH SPECIAL-QUALITY AMARANTH PRODUCTS

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ABSTRACT

Unhealthy nutrition has grave consequences. Diseases of nutritional origin (gastrointestinal diseases, chronic metabolic diseases, asthma, cancer, various deficiency diseases) are becoming more and more common. Therefore certain groups of people turn increasingly to conscious nutrition, as part of which foods with natural materials are preferred. Amaranth products produced organic also belong to this system.

1. INTRODUCTION

Amaranth is more and more frequently encountered as a rediscovered raw material, first of all in non-traditional diets. Amaranth can be classified into the group of pseudocereals, which means that although taxonomically it does not belong to the family of grains, it is included among them because its floury seeds with a high starch content are hulled and ground, similarly to grains.
The advantages of amaranth include that its cultivation is simple, it tolerates dryness and can be grown in chemical-free organic production (Kripner, 2006). Amaranthussp is used for nutritional purposes, it is one of the most ancient cultivated plants in the history of mankind, it witnessed the flourishing and the fall of the Aztec and Inca empires. It originates from the place where corn, potato, pepper, tomato and bean came to Europe. Before America was discovered, it served as a staple food, together with corn and bean, for the peoples living there. Its deliberate cultivation dates back to 5-6000 years ago. Its importance at that time is confirmed by the record according to which Montezuma – the last Aztec emperor – received an annual amount of 5000 tons of corn and 3700 tons of amaranth seeds from his subjects as tax.

Conquerors arriving from Christian Europe looked upon amaranth as a means of barbaric rituals, and in order to put an end to it, Cortez banned the cultivation of amaranth in 1519. Thus amaranth was pushed back into the hidden mountain villages of South and Central America, where its cultivation was continued until it was "rediscovered" again a few hundred years later. Interest in amaranth has been revived since the 1970s when NASA researchers discovered its useful inner content values and incorporated amaranth in the astronauts' diet (Szőcs, 2004).

Nutritional-physiological value of amaranth seed and its utilization in food industry

During the past 30 years the advantageous physiological properties of amaranth seed were confirmed by several examinations. Both Hungarian and foreign examinations revealed that the average protein, fat, fibre and mineral content of the seeds of various amaranth varieties is higher while their carbohydrate content is lower than in traditional

grains. When the inner content of amaranth is examined and compared with that of wheat and other grains, a number of significant differences can be observed. (Table 1)

Table 1 Comparison of the inner content of amaranth with that of other grains

Grain type	Protein (%)	Lysine proportion (%)	Carbohydrate (mg/100g)	Calcium (mg/100g)	Iron (mg/100g)	Magnesium (mg/100g)
Amaranth	16	6.7	63	240	10	280
Wheat	10	2.9	71	41	3.3	20
Amaranth/ wheat	160%	231%	89%	585%	300%	1400%
Corn	9	2.5	74	20	1.8	7
Rye	13	4.0	73	38	2.6	-
Buckwheat	12	5.8	72	33	2.8	-
Rice	7	2.7	77	32	1.6	13

Its protein content is 20-60 % higher while its carbohydrate content is 10-15 % lower than that of other grains. The further examination of protein reveals that lysine, which is an amino acid of great importance in muscle building and regeneration, is present in considerably larger quantities than e.g. in wheat. Another extremely important property of amaranth is that its proteins contain practically no gluten, so flour-sensitive persons can also consume it. The amaranth seed (particularly the germ and the shell of the seed) is rich in minerals, it contains five times more iron, seven times more calcium and four times more zinc than wheat flour, and its magnesium content is also very high (Léder, 2000). Its magnesium content is all the more noteworthy because magnesium is a substance with a role in preventing infarction. As regards its vitamin content, its ground seed contains vitamin C in addition to vitamins B and E, characteristic of grains.

The amaranth seed can be ground, like the seeds of other grains. Similarly to them, several grounds can be obtained: *germ flour*, *whole grain flour* and *traditional flour*. The latter two types of flour can be used in all kinds of products and food, just like ordinary wheat flour or rye flour. The only essential difference concerning preparation is that leavened dough (bread, milk loaf, scones, etc.) cannot be prepared from amaranth flour alone as gluten-forming proteins are absent from it. For this reason it is usually blended with wheat flour. These blends are much more valuable than their components alone. The proportion of amaranth flour is usually below 30 % in the blend.

Amaranth flour is not as white as wheat flour, its colour is rather light grey. Its odour is determined by the oil it contains, and its feel is also oily, sticky in a powder-like way. The customary flavour of the products (bread or cake) made from blended flour is changed by the addition of amaranth hardly at all. It is rather the texture of the product which changes, it becomes more compact, oilier in character and more filling. Compared with ordinary recipes, less oil or margarine is needed. Such products retain their freshness for a longer time, they dry and age more slowly than products made from pure wheat flour. This is especially noticeable in the case of various breads (Jánoska, 2003).

Amaranth seeds can be ground to flour, in addition to which they also offer a wide range of nutritional applications in a *popped form*. It can be used in several foods, including morning cereals, breadcrumbs for meat, fish or poultry, confectionery products (when added to chocolate, it enhances flavour and texture), salad dressings (e.g. popped amaranth strewn on salads), bakery products (breads, tea cakes, cookies, biscuits), extruded snacks, chips, pastas, healthy food, soups and dietary products.

2. MATERIALS AND METHODS

Applying the marketing research principles and methods, laid down by Lakner and his co-workers (Lakner and Sass, 1997; Szabó et al.,1998; 2000;)

In spring 2006, we asked consumers in two organic shops in Szeged and in one in Budapest about their familiarity with and consumption habits of amaranth products, with the help of the questionnaire method.

3. RESULTS

186 customers were questioned during the survey, and only 34 % of them knew amaranth products. This relatively low proportion shows that even conscious biofood consumers are relatively unfamiliar with the amaranth plant and with the products made from it. As to the composition of the consumers, it was found that typically women wishing to adopt a healthier lifestyle in the family's diet purchase these products. These families consist of three members on average, the majority of them have higher school qualifications, most of them a university or college degree. Basically, the customers' income falls into the medium earnings category, consequently amaranth products do not classify as luxury products (they are typically in the medium price bracket).

Customers in organic shops are the most familiar with popped amaranth (67.8 %), then with natural seed and finally with amaranth flour. (Fig. 1)

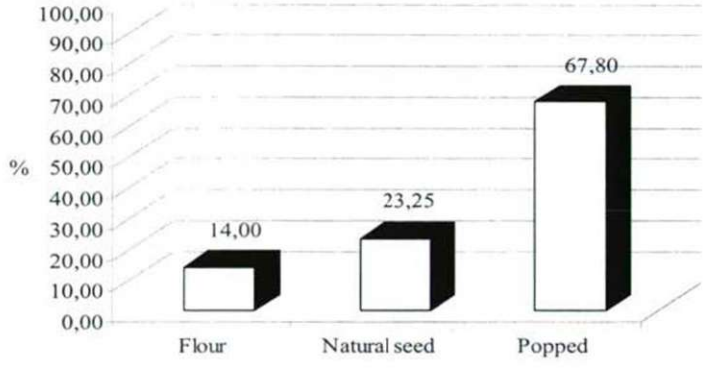

Figure 1. Familiarity with amaranth products in percentage of answerers

The greatest part of costumers first met the products while looking around in bioshops, only few of them were recommended amaranth products by doctors or natural therapists. The people questioned had practically never seen or heard advertisements or other marketing means.

The answers given to the questions on the consumption habits of *amaranth flour* revealed that it is used almost exclusively to improve bread and cakes, supposedly because of the recognition of the positive physiological properties of the product. The typical quantity consumed is 1-3 bags a month (0.5-1.5 kg) for most of the answerers.

Natural amaranth seed is most commonly used as garnish. Besides, it is also used in soups and as an enricher when baking bread. A monthly amount of 3 bags (0.75 kg) is consumed on average.

Popped amaranth is the most widely used amaranth product. It is the most frequently used for enriching mueslis, but it is often consumed with milk, dairy products or in itself, too. Some consumers incorporate it in various foods such as meatballs, salads, home-made cheese, etc. An average family consumes 1-3 bags (10-30 dkg) a month.

An important aim of our survey was to find out how satisfied the consumers are with certain properties of amaranth products. (Table. 2) The answerers could evaluate the properties of the products known by them on a 5-degree scale.

Consumers were the most satisfied (a score of 4.28) with the packaging of the products. Larger packagings would be welcome by customers who consume a greater quantity of popped amaranth. Some of them would like to buy a smaller packaging of flour as they use only a smaller quantity.

The packing of amaranth products as a function to protect the product was not disapproved of. However, many customers missed resealable packing materials, which would ensure to preserve quality after opening. This would be important especially in the case of flour and popped amaranth as they become rancid soon after opening.

Table 2 Evaluation of the properties of the products on a 5-degree scale

Factors	Average	Standard deviation
Packaging	4.28	1.263
Packing	4.17	1.251
Availability	4.13	0.932
Price	4.10	1.185
Information on physiological effects	3.92	1.198
Choice	3.78	1.246

The availability of the products was satisfactory for the customers asked (average score of 4.13). The customers are aware that amaranth products can be purchased only in bioshops. However, some of them would prefer their sale in a wider range; they would like to see these products on the shelves of supermarkets, too.

The price of the products was marked with an average score of 4.1. The majority of the customers did not object to the prices, on the one hand possibly because there are no similar, comparable products. On the other hand, the relatively low quantity consumed does not involve great costs, and in our opinion consumers would be willing to pay an even higher price for more processed products.

The average score given to the question concerning information on the physiological effects was 3.92. Customers obtain information mostly from the labels on the packing; unfortunately other possible means of communication and promotion hardly care to provide more information or to propagate the positive aspects of amaranth products.

The answerers were the least satisfied with the choice (average score of 3.78). They would like to see the enlargement of the available product choice. This could be expected in advance, that is why the question regarding the reception of potential new products was included in the questionnaire. The answers given to this question are evaluated in Figure 2.

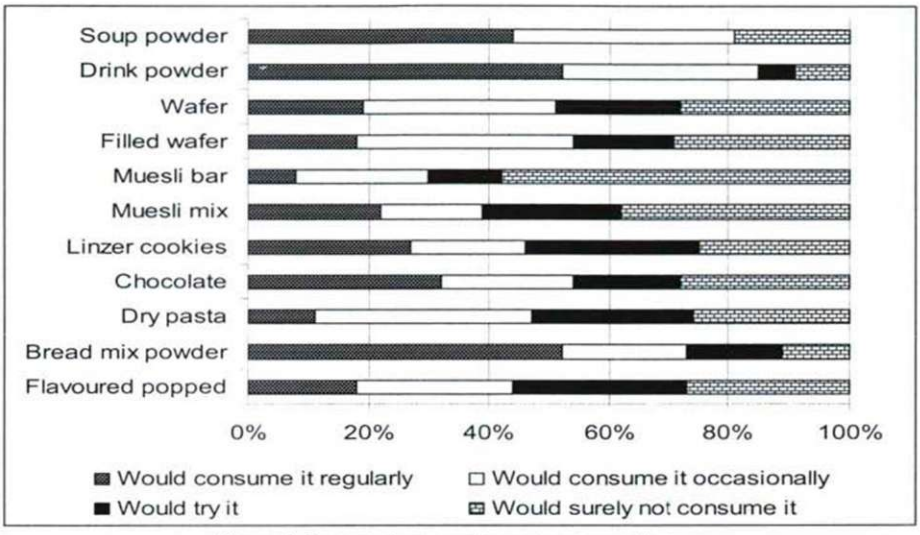

Figure 2. Customer's responsiveness to new products

It is clear from the answers that various powdered products would be the most welcome (soup, drink and bread mix powder). In our opinion these products could even be classified into a group of convenience products, the demand for which represents new challenges and market possibilities for participants in the food industry.

Chocolate would also be received favourably by the customers questioned, it could be popular especially with families with children. However, one must remember that packing should be youthful as appearance and design are important for children.

There was smaller interest in muesli mixes, probably because most people prepare their own similar mixes themselves. Popped amaranth, however, is usually included in the mix prepared according to taste.

The reception of wafer, Linzer cookies, dry pasta and flavoured popped amaranth is uncertain. Most of the answerers would not mind consuming them, but at the same time only few of the customers asked in the survey would consume them regularly.

4. CONCLUSION

First the nutritional advantages of amaranth seed were discussed during our work, and then an attempt was made to assess the habits of amaranth consumption with a questionnaire survey. It is clearly shown by the results obtained that even biofood consumers are familiar with amaranth to a small extent only. Therefore it would be extremely important to put greater emphasis on various means of marketing during the distribution of the products and to extend the range of consumers with the help of intensive marketing activities.

This in turn could enhance production, and the increased demands on the consumers' part could give possibilities for small and medium-sized enterprises by increasing the product range.

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